

Claims

1. (Original) A method for lymphatic system imaging, comprising:
administering an image enhancing amount of a dendrimer conjugate to a subject, the dendrimer conjugate comprising a DAB-G4D, DAB-G5D, DAB-G6D, DAB-G7D, DAB-G8D, PAMAM-G4D, PAMAM-G5D, PAMAM-G6D, PAMAM-G7D, or PAMAM-G8D dendrimer and a metal chelate; and
detecting a difference in an image signal intensity of at least a portion of the lymphatic system after the dendrimer conjugate is administered, wherein the difference in image signal intensity indicates a condition of the lymphatic system.
2. (Original) The method of claim 1, wherein the dendrimer is DAB-G5D, PAMAM-G4D, PAMAM-G6D or PAMAM-G8D.
3. (Original) The method of claim 2, wherein the dendrimer is PAMAM-G6D.
4. (Original) The method of claim 1, wherein the metal chelate is a DTPA metal chelate, a DOTA metal chelate, a DO3A metal chelate, a DOXA metal chelate, a NOTA metal chelate, a TETA metal chelate, a DOTA-N(2-aminoethyl)amide metal chelate, a DOTA-N-(2-aminophenethyl)amide metal chelate, a BOPTA metal chelate, a HP-DO3A metal chelate, a DO3MA metal chelate, or a IB4M metal chelate.
5. (Original) The method of claim 1, wherein the metal chelate comprises a metal ion of a metal selected from the metals having atomic numbers of 22-29, 42, 44 and 58-70 and combinations thereof.
6. (Original) The method of claim 5, wherein the image signal intensity is a magnetic resonance signal intensity and the metal ion is chromium (III), manganese (II), iron (II), iron (III), cobalt (II), nickel (II), copper (II), praseodymium (III), neodymium (III), samarium (III), gadolinium (III), terbium (III), dysprosium (III), holmium (III), erbium (III) or ytterbium (III).

7. (Original) The method of claim 6, wherein the metal ion is gadolinium (III).
8. (Original) The method of claim 7, wherein the metal chelate is a 1B4M metal chelate and the dendrimer conjugate is DAB-G4, DAB-G5, DAB-G6, DAB-G7, DAB-G8, PAMAM-G4, PAMAM-G5, PAMAM-G6, PAMAM-G7 or PAMAM-G8.
9. (Original) The method of claim 8, wherein the dendrimer conjugate is DAB-G5, PAMAM-G4, PAMAM-G6, or PAMAM-G8.
10. (Original) The method of claim 9, wherein the dendrimer conjugate is PAMAM-G6.
11. (Original) The method of claim 1, wherein the dendrimer conjugate further comprises an optical or fluorescent moiety.
12. (Original) The method of claim 1, wherein administering an imaging enhancing amount of the dendrimer conjugate comprises administering a dose between about 0.0001 mmol metal/kg of the subject's body weight and about 1.0 mmol metal/kg of the subject's body weight.
13. (Original) The method of claim 1, wherein administering comprises injecting the dendrimer conjugate intravenously, intracutaneously, intradermally, subdermally, peritonally, intratumorally, into the lymphatic system, into a surgical field or peritumorally.
14. (Original) The method of claim 13, wherein administering the dendrimer conjugate comprises injecting the dendrimer conjugate intratumorally or peritumorally.
15. (Original) The method of claim 1, wherein the portion of the lymphatic system comprises a lymph node.

16. (Original) The method of claim 15, wherein detecting the difference comprises detecting a lack of image enhancement in the lymph node as an indication of the presence of metastatic cancer cells in the lymph node.

17. (Original) The method of claim 15, wherein the dendrimer conjugate is DAB-G5 or PAMAM-G4.

18. (Original) The method of claim 1, wherein the portion of the lymphatic system comprises a lymphatic vessel.

19. (Original) The method of claim 18, wherein detecting the differences comprises detecting an irregular enhancement as an indication of infection.

20. (Original) The method of claim 1 further comprising detecting differences in signal intensity of the portion of the lymphatic system over time to detect lymphatic flow through the portion of the lymphatic system.

21. (Original) The method of claim 18, wherein the dendrimer conjugate is PAMAM-G8.

22. (Original) The method of claim 1, wherein the portion of the lymphatic system is an axillary lymph node, an inguinal lymph node, a thoracic duct, a subcutaneous lymph node, a deep lymph node or a deep lymphatic vessel.

23. (Original) A method for identifying a lymph node into which lymph fluid flows from a tumor in a subject, comprising:

administering an image-enhancing amount of a dendrimer conjugate to an intratumoral or peritumoral site of administration of the subject, where the dendrimer conjugate is DAB-G4, DAB-G5, DAB-G6, DAB-G7, DAB-G8, PAMAM-G4, PAMAM-G5, PAMAM-G6, PAMAM-G7 or PAMAM-G8;

imaging a path of lymph fluid flow from the site of administration using magnetic resonance imaging of the dendrimer conjugate to provide an image of the lymphatic system draining the tumor; and

identifying the lymph node in the image of the lymphatic system draining the tumor.

24. (Original) The method of claim 23, wherein the lymph node is a first lymph node along the path of lymph fluid flow.

25. (Original) The method of claim 24 further comprising imaging the path of lymph flow over time to locate a lymph node into which lymph fluid flowing from the tumor first appears.

26. (Original) The method of claim 23, further comprising detecting metastatic tumor cells in the lymph node by detecting an image filling defect of at least a portion of the lymph node.

27. (Currently Amended) The method of claim 23, wherein the dendrimer conjugate is DAB-G5, PAMAM-G4, ~~or~~ PAMAM-G6, or PAMAM-G8.

28. (Original) The method of claim 27, wherein the dendrimer conjugate is PAMAM-G6.

29. (Original) The method of claim 23, wherein the tumor is a breast tumor.

30. (Original) The method of claim 23, wherein the dendrimer conjugate further comprises an optical or fluorescent moiety and the path of lymph flow from the tumor is visually detected during surgical removal of a portion of the lymphatic system draining the tumor.

31. (Original) The method of claim 23, wherein administering an image-enhancing amount of the dendrimer conjugate comprises administering a dose of between about 0.0001 mmol Gd/kg of the subject's body weight and 1.0 mmol Gd/kg of the subject's body weight.

32. (Original) The method of claim 23, further comprising using the image of the lymphatic system draining the tumor to guide a needle to the location of the lymph node.

33. (Original) The method of claim 32, further comprising obtaining a sample of the lymph node with the needle and analyzing the sample for the presence of metastatic cancer cells.